(Unclassified Paper)

NAVAL WAR COLLEGE
Newport, R.I.

FRATRICIDE:
INCORPORATING DESERT STORM LESSONS LEARNED

by

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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

Signature: 20 MAY 96

05 March 1997

Paper directed by
Captain George W. Jackson, U.S. Navy
Chairman, Operations Department

Faculty Advisor _____ Date

REPORT DOCUMENTATION PAGE

1. Report Security Classification: UNCLASSIFIED	
2. Security Classification Authority:	
3. Declassification/Downgrading Schedule:	
4. Distribution/Availability of Report: DISTRIBUTION STATEMENT A: APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED.	
5. Name of Performing Organization: JOINT MILITARY OPERATIONS DEPARTMENT	
6. Office Symbol: C	7. Address: NAVAL WAR COLLEGE 686 CUSHING ROAD NEWPORT, RI 02841-1207
8. Title (Include Security Classification): Fratricide: Incorporating DESERT STORM Lessons Learned (Unclassified)	
9. Personal Authors: Commander Danny L. Waterman, U.S. Navy	
10.Type of Report: FINAL	11. Date of Report: 20 May 1996
12.Page Count: 27	
13.Supplementary Notation: A paper submitted to the Faculty of the NWC in partial satisfaction of the requirements of the JMO Department. The contents of this paper reflect my own personal views and are not necessarily endorsed by the NWC or the Department of the Navy.	
14. Ten key words that relate to your paper: Fratricide; Friendly-Fire; DESERT; STORM; Lessons; Learned; Amicicide; Blue-on-Blue; Risk; Causes.	

15.Abstract:

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16.Distribution / Availability of Abstract:	Unclassified X	Same As Rpt	DTIC Users
17.Abstract Security Classification: UNCLASSIFIED			
18.Name of Responsible Individual: CHAIRMAN, JOINT MILITARY OPERATIONS DEPARTMENT			
19.Telephone: 841-~~6159~~ 6461		20.Office Symbol: C	

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INTRODUCTION

According to the 1993 revision of Field Manual 100-5, Operations, fratricide is:

> ... the employment of friendly weapons and munitions with the intent to kill the enemy or destroy his equipment or facilities, which results in unforeseen and unintentional death or injury to friendly personnel.[1]

The fratricide rate of Operation DESERT STORM and the more recent downing of two Army UH-60 Black Hawk helicopters by Air Force F-15 Eagles in Iraq[2] have continued to send shock waves through both the military and the American public. The media blitz sharply focused both military and public attention on these tragedies. The seemingly high fratricide casualty rate experienced in DESERT STORM appeared to be a "recent disease."

> In fact, the official friendly fire casualty rate is pegged at **17 percent** [emphasis added] for DESERT STORM: 613 battle casualties, 146 killed or died of wounds, 467 personnel wounded. Of the 146 killed, 35 were fratricide, and of the 467 wounded, 67 were caused by coalition forces--depressing to consider.[3]

Among the reasons offered for the apparently high fratricide rate include: the increased accuracy, lethality, and range of weapons outstripped the ability of the shooter to identify the target; friendly fire appeared large because the total number of casualties was small; the short duration of the conflict did not allow troops to gain battle experience; and the ability to collect data was facilitated through weapon platform cameras and the unique nature of U.S. weapons , for example, depleted uranium rounds. Yet, despite the

high press coverage, the **DESERT STORM fratricide incident rate was not anomalous**. ~~There~~ were a few detailed casualty surveys conducted during World War II and Vietnam that provided reliable estimates of historical friendly fire casualties. Using the definition of fratricide in the 1993 edition of FM 100-5, and starting with World War II, the after action surveys yielded the following rates of fratricide: New Georgia and Burma July 18 through August 5, 1943 and February 15 through June 8, 1944, **14 percent;** Bougainville Beachhead, February 15 through April 21, 1944, **12 percent**; Bougainville autopsy March 22 through April 21, 1944, **24 percent;** and Vietnam Wounds Data and Munitions Effectiveness (WDME) 1967 through 1969, **11 percent** (excludes casualties from air delivered ordnance).[4] Similar evidence of the rate of fratricide in Vietnam was provided by Major Charles F. Hawkins through a careful review of an infantry battalion's 1970 tactical operations center journals during four months of low- and mid-intensity conflict. The fratricide rate was **14 percent** and included casualties from air delivered ordnance.[5] The fratricide rate in Grenada was estimated to be **17 percent**.[6] Operation JUST CAUSE conducted in Panama in December 1989 produced a fratricide rate of **12 percent wounded** and **13 percent killed.**[7] Table 1 summarizes these surveys.

Conflict	Source of Data	Fratricide Rate
World War II	New Georgia	14%
World War II	Burma	14%
World War II	Bougainville	12%
World War II	Bougainville Autopsy	24%
Vietnam	WDME	11%
Vietnam	Hawkins	14%
Grenada	TRADOC	17%
JUST CAUSE	DoD	12%
DESERT STORM	DoD	17%

Table 1. Estimated Fratricide Rates

Compared to previous wars, the fratricide rate of 17 percent alarmingly exceeded the notional ~~two~~ percent dutifully accepted by the American military. In a June 1994 Proceedings article, Major Charles F. Hawkins traced the path of the two percent nominal rate from its errant genesis by French General Alexander Percin in World I, into, and through, U.S. Army literature, and finally to its enthusiastic acceptance by the American news media in the wake of DESERT STORM.[8]

These historical fratricide surveys, where good data was available, show a pattern of fratricide rates similar to Operation DESERT STORM, **17 percent**, and show that past rates of fratricide have been substantially underestimated using the notional **2 percent**.

Historically, the risk of fratricide probably did not receive the proper level of attention it deserved by commanders and this past neglect may have facilitated the DESERT STORM fratricide rate. The 1986 revision of FM 100-5, Operations, did not even mention fratricide prevention and failed to define it.[9] Nor does the March 1994 version of Joint Pub 1-02, DoD Dictionary of Military and Associated Terms, define fratricide. Unfortunately, at least during the past 50 years of U.S. conflicts, fratricide has been an underreported and underestimated **major source of casualties**.

Since fratricide has the potential to be a major source of casualties, the commander must consider the risk of fratricide in his planning process as a significant, governing factor. The public outrage over a continued fratricide rate comparable to DESERT STORM may sap the will of the American people, making it politically impossible to successfully conduct war or military operations other than war (MOOTW).

Fratricide strikes hard at the psyche of the military and inflicts compound detrimental effects on combatants.

Effects of Fratricide
Hesitation to conduct limited visibility operations
Loss of confidence in the unit's leadership
Increase of leader self-doubt
Hesitation to use supporting combat systems
Over supervision of units
Loss of initiative
Loss of aggressiveness during fire and maneuver
Disrupted operations
Needless loss of combat power
General degradation of cohesion and morale

Table 2.[10]

However, fratricide should be reduced, not eliminated. The noble goal of total elimination is unrealistic and may be counterproductive. A 1993 U.S. Congress, Office of Technology Assessment report asserts the elimination of fratricide should not be pursued and may be counterproductive.

> Overly restrictive rules of engagement, for example, may so reduce combat effectiveness that casualties inflicted by the enemy increase more than friendly fire losses are reduced.[11]

This is also in concert with Joint Pub 3-0, Doctrine for Joint Operations, which indicates commanders should seek to minimize the potential for fratricide while not limiting boldness and audacity in combat.[12]

Fratricide results from multiple causes including: malfunctioning equipment; navigation errors; poor communications; poor planning; lack of discipline; and

misidentification. This paper will contend the primary reason for fratricide is the **lack of combat identification,** which results from a combination of poor navigation, poor communication, and misidentification. It will also review current efforts to incorporate the lessons learned from DESERT STORM to reduce fratricide.

BACKGROUND

The Shock

An unforeseen result of the war on the Arabian Peninsula was a seemingly high fratricide rate of 17 percent. The astonished U.S. services, and some coalition partners, rapidly initiated multiphased efforts to address the problem, with the Army leading the effort.

> The Abrams M1A1 was the worst offender in the Gulf, responsible for 85% of the fratricide casualties. (The U.S. lost 10 tanks in the war, seven to fratricide; of 28 Bradley Fighting Vehicles destroyed, 22-23 were victims of fratricide).[13]

Little wonder the Army took the lead in fratricide reduction, since the Abrams M1A1 was the major offender. However, it can be argued that since the Coalition held total air and sea superiority shortly after the initiation of Operation DESERT STORM, the Air Force and Navy experienced deceptively low fratricide risks.

Following the highly publicized fratricide rate of DESERT STORM, the Army immediately initiated the Combat Identification Task Force and the Fratricide Prevention Force. The Army aggressively pursued a multiphased effort to address fratricide reduction through training, doctrine, and technology. In addition to pursuing near-term

technological solutions of armor identification techniques, the Army is now seeking a long-term technological solution by "digitizing" the battlefield to monitor the positions of friendly forces.[14]

Causes of Fratricide

The different causes of fratricide include malfunctioning equipment, navigation errors, poor communications, poor planning, lack of discipline and misidentification.

Equipment malfunctions are statistically insignificant and few cases of fratricide result from **purely** mechanical failure.[15] In fact, equipment malfunctions are excluded from the FM 100-5, Operations, definition of fratricide.

Next, navigation errors are thought by some to have caused most of the friendly fire casualties in DESERT STORM:

> U.S. Air Force Lt. Gen. Charles Horner told the Asian-Pacific Defense '92 conference in Singapore that most friendly fire casualties occurred in the featureless desert because of mislocated ground forces, a problem that can't be solved with the active Identification Friend or Foe (IFF) systems used on aircraft. "On the ground, if you have some sort of active system like that then the enemy of course figures out how to use it and it tells him where your forces are," Horner said.[16]

Mislocated forces significantly increase the risk of fratricide. However, in the end, it is misidentification that results in someone shooting at a friend. The design of any active system to provide the identification of friendly forces must also deny the enemy a friendly's position.

Another cause of fratricide is poor communications. A failure in communication may result in the inability to tell forces where to be, for forces to know where they are, for

forces to report **where** they are, or to tell forces the location of other friendly forces.

Poor navigation, such as being in the wrong place, coupled with poor communications between forces as they maneuver about the battlefield, result in poor **situational awareness**. Situational awareness is defined in the Center for Army Lessons Learned (CALL) Newsletter, No. 92-4:

> **SITUATIONAL AWARENESS: The real-time accurate knowledge of one's own location [and orientation], as well as the locations of friendly, enemy, neutrals, and noncombatants. This includes awareness of the METT-T** [Mission, Enemy, Terrain, Troops, and Time] **conditions that impact the operation.** [emphasis in the original][17]

Failures during planning often translate to failures in execution. History is wrought with fratricidal exchanges as a result of poor planning. For example, in World War II, Operation COBRA at St. Lo resulted in U.S. bombers killing 111 and wounding 490 friendly forces because the planners elected to bomb perpendicular vice parallel to the front lines.[18]

Lapses in fire discipline and violations in rules of engagement can be stress and fear driven causes of fratricide. Examples are out of sector engagements and unauthorized discharges. Fear compels men to shoot first rather than risk being shot.

Finally, misidentification happens when forces cannot distinguish between friendly and enemy targets. Compounding the problem are limited visibility, an enemy equipped similarly to friendly forces, and identification procedures that have not kept pace with warfighting capabilities.

COMBAT IDENTIFICATION

The major cause for fratricide during DESERT STORM was the **lack of Combat Identification**. Combat Identification breaks down into three segments: situational awareness, identification of friends, and identification of foes. Identification of friends and foes need not be visual, but can be through third party targeting, cooperative identification systems such as MK XII IFF used on board aircraft and ships, or through non-cooperative target identification systems such as the Non-Cooperative Target Recognition System (NCTR) used on board F/A-18 Hornets.

During DESERT STORM the rules of engagement in ground-to-ground combat allowed the forces to fire as long as they could ensure that the target was not a friend. In the air war, the rules allowed the shooters to fire only on a positively identified foe. Despite these rules of engagement, poor combat identification resulted in the majority of the fratricide incidents.

Friendly Fire Incidents

There were 28 fratricide incidents during the war; the majority of them, 16, were attributed to ground-to-ground direct fire, resulting in 57 wounded and 24 killed. There were nine air-to-ground incidents resulting in 15 wounded and 11 killed. Two ship-to-ship incidents resulted in no casualties and the single ground-to-air incident resulted in no casualties. Surprisingly, there was only one artillery incident. In previous U.S. conflicts, indirect fire was a major source of fratricide.[19] Ineffective combat identification can be attributed to all but one of the ground-to-ground fratricide casualties and to 50 percent of the air-to-ground fratricide casualties. See appendix A.

CONSIDERATIONS

In addition to political and ethical issues, fratricide significantly reduces the battlefield advantage.

> It should be noted, however, that the impact of amicicide (fratricide) on combat power is geometric, not linear. Each amicicide incident that results in friendly troops killed or wounded has an adverse effect on morale and confidence in supporting arms, disrupts the continuity of friendly operations, and represents one bomb, shell, or bullet that should have fallen on the enemy to reduce his combat power rather than our own.[20]

Fratricide reduction must continue to have the high priority it received in the wake of DESERT STORM, both in the near- and long-term. The scale of the required investments in technology remains an unavoidable issue and has already lessened congressional support for speedy action:

> The GAO report, "Minimizing Friendly Fire: The Army Should Consider Long-Term Solution in Its Procurement on Near-Term Needs": recommended the defense secretary direct the Army not to proceed with the production of a near-term system until the service determines whether the near-term technology can be integrated into mid- and long-term target identification solutions.[21]

This report resulted in a 75 percent budget reduction, effectively canceling a program that would have purchased 1,520 IFF devices designed to fit on seventeen different ground vehicles, ranging from high mobility multipurpose wheeled vehicles (HMMWVs) to Abrams tanks, and two air platforms, the Kiowa and Apache helicopters. The GAO report cited concerns that the near-term IFF device was not compatible with the

MK XII IFF system currently used by the Air Force and Navy and that the near-term device was not required to be integrated with the Army's long-term anti-fratricide systems. The Army plans to introduce an integrated active device in FY 2003.[22]

Near-Term

Near-term steps taken to reduce fratricide include changes to doctrine, changes in the planning process, changes to weapon system acquisition policy, and changes in training.

DESERT STORM after action reports revealed weaknesses in doctrine when U.S. forces, for the first time, used scatterable mines. Additionally, a blind spot in doctrine was discovered pertaining to unexploded submunitions; there was no doctrine addressing the transfer of information concerning locations of areas saturated with submunitions. Eleven more Americans were killed when unexploded Allied munitions blew up.[23] Doctrine revisions and development are underway to address these problems.[24]

The 1995 revision to JP 3-0, Doctrine for Joint Operations, took a step in the right direction and directs commanders to institute preventative measures to reduce the risk of fratricide in their planning:

> Prevention of Fratricide. JFCs make every effort to reduce the potential for fratricide--the unintentional killing or wounding of friendly personnel by friendly fire. The destructive power and range of modern weapons, coupled with the high intensity and rapid tempo of modern combat, increase the potential for fratricide. Commanders must be aware of those situations that increase the risk of fratricide **and institute appropriate preventative measures** [emphasis added].[25]

At the Naval War College, Newport, Rhode Island, during the seminar devoted to one of the most critical aspects of the planning process, the Commander's Estimate of the Situation (CES), the risk of fratricide is not broached, nor is it included in the March 1996 revision of the student instructional worksheet, Commander's Estimate of the Situation, NWC 4038. Similarly, at the U.S. Army Command and General Staff College, Fort Leavenworth, Kansas, the risk of fratricide is not mentioned during the lessons dealing with the deliberate decision process and it is not included in the August 1995 revision of the student text 101-5, Command and Staff Decision Processes.[26]

When analyzing Courses of Action (COA) during the staff planning process a commander should carefully weigh the risk of fratricide as one of his governing factors with respect to the mission. The failure of a commander to consider the risk of fratricide when analyzing Courses of Action could result in the commander failing to take measures to reduce the likelihood of a precondition for fratricide.[27] These preventative measures need to be integrated into both planning and execution. Additionally, the services' war colleges and the commanders' planning staffs need to do their part by considering the likelihood of friendly fire in the drafting of plans.

> ...we, as leaders **must** [emphasis in original] incorporate risk reduction measures in planning. As an example, if synchronization and mission success, with minimum casualties, depend heavily upon accurate and efficient navigation, then navigation is the high risk area. In this case a commander cannot delegate navigation to one or two key players. Despite known ability, any individual might fail.[28]

Recent steps have been taken to incorporate fratricide reduction technologies in the acquisition of new weapon systems. In December 1993, the Joint Requirement Oversight Council (JROC) was directed to review all Operational Requirements Documents (ORD) to ensure no weapon systems proceed to a Milestone I decision, unless combat identification is specifically addressed.[29] A review of Cost and Operational Effectiveness Analyses (COEA) for combat vehicles in the late 1970's showed that combat identification was not a requirement.[30] During a keynote address in August, 1994, Emmett Paige, Assistant Secretary of Defense for C^3I, updated the policy of the current administration concerning combat identification.

> The policy of this administration is very clear on this topic, and as stated by the Secretary of Defense, I quote:
> "Services will rapidly develop and field, as a high priority, an integrated, enhanced identification capability to reduce the risk of fratricide to armor, aircraft, and ships. Services will also formulate a program for air-to-air and surface-to-air capability with initial operational capability by 2001; integrate where required, the new civil air traffic control functions (Mode S) into new identification equipment; and pursue cooperation on these systems with allies to ensure interoperability and reduced costs."[31]

In April 1995, in what was hailed as a breakthrough in armaments cooperation, all NATO members, (except France), agreed to use U.S. combat identification systems for multinational operations until 1998, when a standard technology will be selected for long-term development and alliance use. The current combat identification systems include thermal tape and the U.S. made "Budd Light" passive identification system.[32] The "Budd Light" is an ordinary nine-volt battery topped with an infrared blinker that produces timed flashes of infrared light. At night, both the thermal tape and the "Budd Light" are visible

only through night vision goggles. These systems, in addition to GPS receivers, are now in use in Bosnia.[33] Also in the near-term, four nations are competing to provide cooperative target millimeter wave (MMW) technical solutions that would provide an accurate and dependable ability to discriminate at "point-of-fire" between friend and foe, at the maximum engagement and acquisition range of ground-to-ground weapon systems. These technical solutions are to be evaluated in Germany in May 1997 with the goal of setting up a common system to minimize fratricide casualties. All parties, France, Germany, United Kingdom, and the United States, have nominally agreed that "intellectual property rights" to the individual national solutions will be granted to foreign industries.[33]

Unfortunately, these new millimeter-wave (MMW) systems may fall short in addressing the air-to-ground fratricide problem.

> Already it is being said the range potential of MMW systems is inadequate for the stand-off distances at which most aircrew will wish to launch their weapons. Therefore, despite the 1990-91 Gulf War furor concerning the fratricide occasioned by air-launched weapons, it seems very likely that ground forces will have to trust in pilot professionalism for some years yet, albeit aided by the situational-awareness information sources now being introduced into aircraft cockpits.[35]

Development of doctrine, addressing fratricide risks at all levels in the planning process, and fielding near-term technological solutions are important steps in near-term fratricide reduction. However, training is required to incorporate any of these steps. Training is required now and in the future. Some of the current training programs to reduce fratricide include: introduction of friendly lost and neutral vehicles interspersed with the training units at training centers; combat identification training using optical and

thermal images depicting friendly and threat platforms at various ranges and conditions; development of fratricide training tapes; improved graphics in simulators; and field training with emphasis on minimizing fratricide risks without sacrificing mission success.[36] The long-term solution will require fielding new technologies, developing doctrine addressing them, and providing training in their proper use.

Long Term

Leveraging technology is a long-term proposition. Technology, as a minimum, could provide a final safety check to compensate for the loss of situational awareness during the fog of war, with no limit on the potential for control and coordination measures.[37] The long-term technical solution could combine situational awareness with target identification beyond the maximum engagement range of the weapon system. However, as pointed out by Emmett Paige, assistant Secretary of Defense for C^3I, during his August 1994 address at the U.S. DoD Joint Service Combat Identification Systems Conference, it is difficult to believe that new communication links for the digitization of the battlefield **and** a separate target identification system would both be affordable.[38] Taken with the reluctance of Congress to support a near-term IFF device for the battlefield, it appears that a continued commitment for a comprehensive, joint technical solution may wane.

CONCLUSIONS

Historically, fratricide did not receive the proper level of attention and was underestimated. The fratricide incident rate during Operation DESERT STORM was not an anomaly. Fratricide has been, and will continue to be, a major source of casualties unless definitive, pro-active, near-term efforts are taken to incorporate the lessons of DESERT STORM into doctrine, planning, and training. These efforts must be melded with a long-term commitment to interoperable, state of the art, integrated battlefield fratricide reduction technologies to improve combat identification.

In future conflicts, it is reasonable to expect some rate of fratricide due to equipment malfunctions and stress. Therefore, the U.S. military should not strive to totally eliminate fratricide, but rather should reduce it to a level that does not sap the political will of the American public from pursuing war or military operations other than war (MOOTW) and allow troops in the field an expectation of acceptable safety.

APPENDIX A

DESERT STORM FRATRICIDE INCIDENTS

Ground-to-Ground Incidents

January 29-Four Marines were killed when their Light Armored Vehicle (LAV) was struck by a TOW missile which was fired from another LAV west of Kafji, Saudi Arabia.

February 14-Three soldiers were wounded in a small arms exchange during urban clearing operations in the town of Arky Amah Al Jadid, Saudi Arabia.

February 24-One Marine was killed when the convoy he was in received fire from a tank.

February 26- Three soldiers were killed and three wounded when their armored personnel carrier (APC) was hit by machine gun fire from a tank.

February 26-One soldier was killed when his vehicle was hit by a premature burst of an artillery round.

February 26-Five soldiers were wounded when their Bradley Fighting Vehicle (BFV) was incorrectly identified and hit by a TOW missile.

February 26-Two M1A1 Abrams tanks were hit by fire from another M1A1 tank. No casualties occurred.

February 26-Two soldiers were killed and six wounded when their BFV, which was operating in reduced visibility, received fire from a M1A1 Abrams tank.

February 26-Two BFV's, while operating at night in reduced visibility, were fired upon by a M1A1 tank. No casualties occurred.

February 27-Six soldiers were killed and 25 wounded when five M1A1 tanks and five BFV's engaging enemy forces were incorrectly identified at night in reduced visibility and engaged by other M1A1 tanks.

February 27-Two soldiers were killed and nine were wounded when three BFV's were fired upon by a M1A1 tank because of incorrect identification.

February 27-Three damaged M1A1 tanks were deliberately destroyed by other M1A1 tanks to assure they could not be used by the enemy.

February 27-One soldier was killed and one wounded when 2 BFV's were incorrectly identified at night in the rain and fired upon by a M1A1 tank.

February 27-One soldier was killed and two were wounded when two BFV's were hit by fire from a M1A1 tank while operating in rain and smoke at night during an attack on a bunker complex.

February 27-Two soldiers were killed and two wounded when their BFV was fired upon by a M1A1 tank while operating at night in reduced visibility.

February 27-One soldier was killed and one wounded by machine gun fire when they were incorrectly identified as Iraqi forces.

Air-to-Ground

January 23-A USAF A-10 Thunderbolt fired on a Marine observation post with no casualties.

January 24-One Marine and one sailor were wounded when a USAF A-10 strafed a USMC Hummvee and a five-ton truck about 60 miles west of Kafji, Saudi Arabia.

January 29-Seven Marines were killed and two wounded when a USAF A-10 fired a Maverick missile which malfunctioned in flight and hit a LAV.

February 2-One Marine was killed and two were wounded during an air attack by a USMC A-6E using 500 pound bombs after their vehicles were incorrectly identified as Iraqi.

February 2-Two soldiers were wounded when a HARM missile fired by a USAF F-4G Wild Weasel did not properly acquire its intended target and locked on to the soldiers' radar.

February 4-A HARM missile is suspected to have landed close to the USS Nicholas (FFG-47) resulting in no casualties and only superficial damage to the ship.

February 17-Two soldiers were killed when a BFV was struck by a Hellfire missile fired from a AH-64 Apache helicopter. Six soldiers were wounded and a ground surveillance vehicle was also damaged in the incident.

February 23-One Marine was killed and one wounded when a HARM missile from an undetermined source struck a radar unit.

February 24-A HARM missile is suspected to have landed close to the USS Jarrett (FFG-33) with no casualties or damage to the ship.

Ship-to-Ship

February 25-~~USS~~ Jarrett (FFG-33) fired at a chaff rocket launched by USS Missouri (BB-63) resulting in superficial damage to USS Missouri. No casualties occurred.

March 27-USS Avenger (MCM-1) received small arms fire while in the vicinity of Ras Al Qalayah. No casualties occurred and the ship moved out of firing range.

Ground-to-Air

February 15-A USN A-6E pilot reported he was fired upon by a surface-to-air missile, resulting in no casualties.[39]

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